

Security and Emergency Preparedness Considerations

Security Considerations

As the SRM for SECY-03-0227 anticipates, decisions involving the design basis for external events such as tornados and earthquakes could have an impact on security issues since they affect the “survivability” of the design. Relevant security issues involved in risk-informing the design basis tornado are discussed here in response to the SRM directives. The tornado design basis has been used to evaluate the adequacy of structures (such as concrete wall thicknesses) to protect nuclear plant SSCs against effects not explicitly addressed in review guidance. Events that are not included in the design basis (such as a commercial airliner striking at high speed) are to a certain extent afforded protection by conservative design specifications. For example, the staff has in the past reviewed external impact hazards (such as general aviation light aircraft crashes, nearby explosions, and explosion debris and missiles), taking into account the provisions for tornado protection. Consequently, to ensure that the plants do not lose significant robustness in surviving these events, these conservative design specifications should be taken into account when evaluating any reduction in the tornado design basis wind speed.

To the extent that the options in this paper incorporate tornado design basis criteria that are slightly less conservative than the criteria to which most of the current operating reactors were designed, future plants designed to any of the proposed option criteria could have a slightly decreased ability to survive the loads that may have been previously subsumed in the tornado design basis (such as the consequences of extreme events of sabotage). The staff is not currently contemplating proposing structural design criteria associated with beyond design basis threat events. If as a result of vulnerability assessment analyses of the current operating reactors, the staff identifies the need for such structural design criteria, the staff will advise the Commission separately.

Emergency Preparedness Considerations

The SRM for SECY-03-0227 directed the staff to consider relevant emergency preparedness issues involved in risk-informing the design basis tornado. Emergency preparedness considerations arise because the destruction caused by a tornado can hinder the evacuation of the local population as well as impact plant integrity. The risk-informed metric associated with accident prevention (core damage frequency (CDF)) is not affected by emergency planning and evacuation. However, the risk-informed metric associated with accident mitigation (large early release frequency (LERF)) is affected by evacuation. LERF events are sequences that can cause early fatalities. Delayed or ineffective evacuation can change a sequence that would not normally cause early fatalities into one that would.

The guidance for estimating LERF¹ which was endorsed by the staff in Regulatory Guide 1.174 specifies consideration of whether effective warning and evacuation may be precluded due to disruption of the warning systems and evacuation paths. The guidance states that sequences arising from initiating events such as tornados that preclude effective evacuation should be

¹W. T. Pratt et al, “An Approach for Estimating the Frequencies of Various Containment Failure Modes and Bypass Events,” NUREG/CR-6595, January 1999.

allocated to the LERF metric unless the licensee can demonstrate that evacuation would not be affected. Consequently, if the Commission approves the staff's recommendation to use the quantitative CDF and LERF guidelines in developing a risk-informed approach to the definition of a design basis tornado, the proper application of current guidance should suffice to ensure that emergency preparedness considerations are included in the analysis.